

NASA Space Radiation Program Integrative Risk Model Toolkit

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NASA Space Radiation Program Element scientists have been actively involved in development of an integrative risk models toolkit that includes models for acute radiation risk and organ dose projection (ARRBOD), NASA space radiation cancer risk projection (NSCR), hemocyte dose estimation (HemoDose), GCR event-based risk model code (GERMcode), and relativistic ion tracks (RITRACKS), NASA radiation track image (NASARTI), and the On-Line Tool for the Assessment of Radiation in Space (OLTARIS). This session will introduce the components of the risk toolkit with opportunity for hands on demonstrations. The brief descriptions of each tools are: ARRBOD for Organ dose projection and acute radiation risk calculation from exposure to solar particle event; NSCR for Projection of cancer risk from exposure to space radiation; HemoDose for retrospective dose estimation by using multi-type blood cell counts; GERMcode for basic physical and biophysical properties for an ion beam, and biophysical and radiobiological properties for a beam transport to the target in the NASA Space Radiation Laboratory beam line; RITRACKS for simulation of heavy ion and δ -ray track structure, radiation chemistry, DNA structure and DNA damage at the molecular scale; NASARTI for modeling of the effects of space radiation on human cells and tissue by incorporating a physical model of tracks, cell nucleus, and DNA damage foci with image segmentation for the automated count; and OLTARIS, an integrated tool set utilizing HZETRN (High Charge and Energy Transport) intended to help scientists and engineers study the effects of space radiation on shielding materials, electronics, and biological systems.